Remarks

Claims 1-13 are pending in the application. Claims 1-13 are rejected. All rejections are respectfully traversed.

The invention rank orders multimedia content. Image or video multimedia content is segmented to extract objects. Features of the objects are then extracted and associated to produce content entities. The content entities are coded to produce directed acyclic graphs of the content entities, each directed acyclic graph representing a particular interpretation of the multimedia content. Attributes of each content entity are measured and the measured attributes are assigned to each corresponding content entity in the directed acyclic graphs to rank order the multimedia content.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeo et al. ("Rapid Scene Analysis on Compressed Video") in view of Ganser et al. (U.S. Patent 4,953,106).

Yeo is a well-known paper in the art of scene change detection in compressed video. Yeo takes as input a compressed video and segments the video into shots. Yeo defines a shot at page 533, left col., second paragraph, below:

> For video, a common first step is to segment the videos into temporal "shots," each representing an event or continuous sequence of actions. A shot is what is captured by a camera between a *record* and a *stop* operations. Further scene analysis

and further down, \

> would be displayed. The boundaries between video shots are commonly known as scene changes and the act of segmenting a video into shots is called scene change detection. There

Yeo is entirely directed to segmenting a video into shots for scene change detection, see page 3, right col., first full paragraph, below:

> In this paper, we propose several fast algorithms that operate directly on Motion JPEG[1] [1] or MPEG [2] compressed videos for temporal segmentation and flashlight detection.

A person of ordinary skill in the art would never confuse a shot with an object. Even Yeo distinguishes an object from a shot, see page 540, left col., section *D*, below:

> video sequences. Unless the shot consists of little or no camera motion and no object motion, one frame may not be sufficient for such purposes.

Therefore, the Examiner's assertion that Yeo teaches segmenting the multimedia content to extract objects can never be true, because Yeo explicitly teaches segmenting a video into shots, and defines a shot as "what is captured by a camera between a *record* and a *stop* operations." The Examiner has confused scene change detection as in Yeo with object extraction as in claim 1.

Features of the objects are extracted and associated to produce content entities. As stated above, Yeo never teaches extracting objects and therefore, does not describe extracting and associating features from objects to produce content entities. The Examiner cites page 533, left column:

> interactive multimedia systems. There is an urgent need to automatically extract key informations from images and videos for the purpose of indexing, fast and easy retrievals, and scene analysis.

That only teaches that extracting key information is important for indexing, retrieving, and analysis. . The Examiner is respectfully requested to specifically point out which words mean extracting and associating features of the objects to produce content entities for the purpose of ordering, as claimed.

Further, the Examiner points to section VII of Yeo as describing measuring ***image attributes*** for image compression. Claimed is measuring ***content entity attributes***, the content entities derived from extracted and associated ***features of the objects*** extracted from the multimedia content. Yeo does not teach content entities.

Gasner describes a method for drawing directed graphs providing reduced crossings and improved picture quality to produce a drawing of the graph. Gasner has nothing to do with producing a directed acyclic graph. Gasner takes as input a directed graph, in the form of a *node interconnection listing*, which can be acyclic, and generates the graph drawing. Node positions in the drawing are assigned in a way that reduces crossings of the lines connected the nodes.

Claimed is coding the content entities to produce directed acyclic graphs of the content entities, each directed acyclic graph representing a particular interpretation of the multimedia content. The measured attributes are assigned to each corresponding content entity in the directed acyclic graphs

to rank order the multimedia content. Gasner initially assigns arbitrary ranks to nodes of a graph as follows:

Col. 5

> **edge is non-negative. To compute the rank function from the final T (block 208), for each tree in T, do a standard breadth first search through the tree, starting at some arbitrary node and assigning it an arbitrary rank. Each time a new node is scanned, it is assigned the rank of the node currently being visited, plus or minus 1, depending on whether the scanned node is the head or tail node, respectively, of the edge between it and the visited node. Finally, the rank assignment for each tree is shifted to make the smallest rank equal to 0.**

Gasner generates a drawing of the graph that has few edge crossings and can be easily understood by a user viewing the graph drawing, see col. 6, below:

> **106 of FIG. 6. Consequently, optimal rank assignments are important not only for their contribution to drawing quality, but also for minimizing the number of dummy nodes and reducing the number of edge crossings and the cost of subsequent passes. This substep also reserves**

Gasner assigns arbitrary ranks to nodes of a graph and shifts the ranks of the nodes according to a rank function to produce a drawing of the graph that has few or no line crossings. Claimed is assigning attributes to content entities to rank order content entities. Gasner is useless for making the invention obvious.

In claim 2, the measured attributes include intensity attributes. The Examiner cites Yeo at section VII, page 543. Section VII describes DCT-based image compression. As stated above, Yeo never describes measuring attributes of content entities derived from extracted and associated features of the objects extracted from the multimedia content, as claimed. The same

is true for claims 3-5, where the measured attributes include direction attributes, spatial attributes, and temporal attributes, respectively.

In claim 6, the measured attributes are arranged in an increasing rank order and in claim 7, the measured attributes are arranged in a decreasing rank order. The Examiner's statement that Gasner "*would have provided the capability for ensuring the initial node ordering of a directed tree has no crossings,*" is non-sequitor. The Examiner's use of Gasner as a reference is totally off the mark. Ensuring *the initial node ordering of a directed tree has no crossings* is entirely irrelevant to what is claimed.

Claim 8 recites traversing the multimedia content according to the directed acyclic graph and the measured attributes assigned to the content entities. Gasner describes assigning 2D spatial coordinates for a position for nodes based on an optimized rank assignment that reduces crossing of the lines connecting the nodes. That has nothing to do with traversing multimedia content, as claimed.

Claim 9 recites summarizing the multimedia content according to the directed acyclic graph and the measured attributes assigned to the content entities. Determining optimal rank assignments of spatial locations of nodes for drawing a graph has absolutely nothing to do with multimedia content summarization. There is no relationship between the two whatsoever. The Applicants are so thoroughly perplexed by the Examiner's assertion, it is requested the Examiner provide a more understandable explanation of what he understands summarizing multimedia content means.

In claim 10, the multimedia content is a three dimensional video sequence. As stated above, Yeo never extracts objects from a video sequence as claimed. Yeo segments a compressed video into shots.

In claim 11, nodes of the directed acyclic graphs represent the content entities and edges represent breaks in the segmentation, and the measured attributes are associated with the corresponding edges. Gasner only teaches nodes of directed acyclic graphs. Columns 9 and 10 of Gasner describe drawing a graph. The Examiner's assertion that Gasner describes nodes represent content entities and edges represent breaks in segmentation is pure conjecture because there is absolutely no description of what a node represents in Gasner and Yeo never teaches content entities as claimed. The Examiner is requested to specifically point out exactly where Gasner describes nodes represent anything at all, and particularly content entities as claimed.

In claim 12, at least one secondary content entity is associated with a particular content entity, and wherein the secondary content entity is selected during the traversing. The Examiner refers to a section of Gasner that describes assigning spatial coordinates to nodes based on rank and priority. There is no description of associating content entities, or nodes for that matter. According to Gasner, a priority of a node is defined as a weighted sum of its out-edges or in-edges. The Examiner is requested to explain what that has to do with what is claimed.

In claim 13, a summary of the multimedia is a selected permutation of the content entities according to the associated ranks. Gasner never summarizes

anything. Gasner draws graphs. Gasner assigns node positions on the graph so that lines connecting the nodes do not cross. The Applicants have no idea how the Examiner came to the conclusion that Gasner is relevant to the invention.

It is believed that this application is now in condition for allowance. A notice to this effect is respectfully requested. Should further questions arise concerning this application, the Examiner is invited to call Applicant's attorney at the number listed below. Please charge any shortage in fees due in connection with the filing of this paper to Deposit Account 50-0749.

Respectfully submitted,
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